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UC Santa Barbara Bio Sciences II

**Grant Award Details**

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UC Santa Barbara Bio Sciences II

**Grant Type:** Major Facilities

**Grant Number:** FA1-00616

**Investigator:**

**Name:** Glenn Lucas

**Institution:** University of California, Santa Barbara

**Type:** PI

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**Award Value:** \$3,205,800

**Status:** Closed

**Grant Application Details**

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**Application Title:** UC Santa Barbara Bio Sciences II

**Public Abstract:**

We propose a CIRM Special Program (Research Element X), supporting basic and discovery research that will fund renovation of space to provide for the establishment of a new Center for Stem Cell Biology and Engineering. CIRM funding will allow us to expand our growing basic research on human embryonic stem cells (hESC) by creating a state-of-the-art facility for new faculty, for collaborative work and for core facilities. We will transform antiquated, inadequate laboratory space to allow research that will be free of federal restrictions.

Research in the proposed Center will focus on two areas of basic and discovery stem cell research: Molecular Mechanisms and Bioengineering. First, studies will focus on the fundamental molecular mechanisms of stem cell growth and differentiation, using hESC and stem cells in simpler organisms that are useful models of developmental processes and disease pathobiology. The second goal will be to investigate novel methods for stem cell growth, differentiation, sorting and delivery, using synergistic cell biological, biomaterial, and bioengineering technologies. The long-term goal will be the application of results to the development of stem cell-based therapeutics for human disease.

Renovation of about 10,000 asf of space, most of it adjacent to the CIRM-funded shared hESC lab, is proposed to accommodate the following three program elements:

1. Space for new faculty members. Laboratory space will be renovated to provide for two new senior faculty members, for which searches are underway. The first, in the area of molecular mechanisms, will fill an endowed chair and act as director of the new Center. The second, in the area of bioengineering and systems biology, will fill another endowed chair.
2. Space for collaborative work. Space free of federal restrictions will be renovated to provide for the expansion of ongoing collaborative work between investigators at our institution and those outside our institution. This will stimulate collaboration and exchange of ideas that would otherwise not be possible.
3. Core Facilities. A much needed Flow Cytometry Core will be established within the facility. Additional renovated space will house Center equipment rooms, meeting rooms, and offices. Finally, several vivarium rooms in the same building will be renovated to accommodate stem cell experiments in animal models. These core facilities will be used by researchers at our institution with ongoing stem cell projects.

This CIRM Special Project will provide crucial funding that will greatly stimulate growth of stem cell research. It will facilitate new, interdisciplinary collaborations that would otherwise be impossible due to federal restrictions and lack of suitable space.

**Statement of Benefit to  
California:**

California, like much of the United States, is facing a staggering challenge to its health care system. A perfect storm of soaring medical costs and the aging of the population augers poorly for the economic future of health care as we know it. Increasingly physicians are treating chronic, debilitating, and therefore expensive diseases with organ specific impairments. The demographic wave of the Baby Boomers will accelerate many of these issues. By 2020 they will average 64 years of age. As a result, the percentage of elderly in California is expected to grow from what was 14 percent in 1990 to 22 percent in 2030. Chronic degenerative diseases, which tend to afflict an aging population, represent a proportionally high percentage of individuals in California. Major innovative approaches are now, more than ever, an imperative. Our stem cell program, with its emphasis on enabling technologies, has the potential to make an impact upon many of these conditions.

Degenerative diseases are those diseases caused by the loss or dysfunction of cells. Examples include cardiovascular disease, osteoarthritis, Parkinson's disease, osteoporosis, diabetes, and macular degeneration. Among these conditions, stem cell work at our institution would leverage a strong existing program in macular degeneration, a condition that is just beginning to be addressed in the stem cell field. Stem cell work for eye disease holds the promise of being an exemplary candidate for cell therapy that could lead the way for the entire field. Targeting clinical conditions that represent "low-hanging fruit" for the field and delivering an early clinical success will clearly benefit the state.

We propose renovation of space to create a Center for Stem Cell Biology and Engineering, where biologists and engineers collaborate on basic and discovery research projects directly relevant to stem cell therapeutics. This highly interactive mix holds a great deal of promise for the opening of stem biology to the bioengineering community, and the development of materials and devices for the stem cell field.

In addition to the medical potential of stem cells and the spear heading of interdisciplinary work, our program will also bring economic benefits to the state. Multiple collaborations with industry have already emerged from our program in a very short time, stimulating growth of the California biotechnology industry.

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